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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (previously presented) A system for co-production of hydrogen and electrical energy comprising:

a fuel cell assembly comprising a plurality of fuel cells, the fuel cells further comprising a cathode inlet for receiving a compressed oxidant, an anode inlet for receiving a fuel feed stream, an anode outlet in fluid communication with an anode exhaust stream and a cathode outlet in fluid communication with a cathode exhaust stream; wherein at least a portion of the fuel feed stream reacts with the oxidant to produce electrical power; and the anode exhaust stream comprises hydrogen, carbon monoxide, carbon dioxide, unreacted fuel and water;

a separation unit in fluid communication with the fuel cell assembly, wherein the separation unit is configured to receive the anode exhaust stream from the fuel cell assembly to separate hydrogen from the anode exhaust stream, and produce a hydrogen rich stream and a recycle stream in which at least a portion of the anode exhaust stream is recycled back to the anode inlet after separation of hydrogen, carbon monoxide, carbon dioxide, unreacted fuel and water;

wherein said system is configured to output both hydrogen and electricity; and

said system is configured to flexibly control production of hydrogen and electricity on demand.

2. (original) The system according to claim 1, wherein the fuel cell assembly is operated in a low utilization mode, in which the fuel feed stream is consumed at a rate less than or equal to 70%.

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3. (canceled)

4. (original) The system according to claim 1, wherein the fuel cell assembly is operated at a voltage of about 0.7 volts to about 0.85 volts.

5. (original) The system according to claim 1, wherein the mole fraction of hydrogen at the anode outlet is between about 0.1 to about 0.5

6. (original) The system according to claim 1, wherein the oxidant is air.

7. (original) The system according to claim 1, wherein the fuel feed stream comprises at least one fuel selected from the group consisting of natural gas, methane, and a coal derived gas.

8. (original) The system according to claim 1 further comprising a heat exchanger configured to receive and heat the fuel feed stream using the anode exhaust stream from the fuel cell assembly.

9. (previously presented) The system according to claim 1, wherein the fuel cell is selected from the group consisting of solid oxide fuel cells, molten carbonate fuel cells, regenerative fuel cells, and protonic ceramic fuel cells.

10. (original) The system according to claim 9, wherein the fuel cell is a solid oxide fuel cell.

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11–14. (cancelled)

15. (previously presented) The system according to claim 1, wherein the separation unit further comprises a low temperature shift reactor for converting carbon monoxide to carbon dioxide and a hydrogen separator.

16. (cancelled)

17. (original) The system according to claim 15, wherein the hydrogen separator comprises at least one membrane.

18. (canceled)

19. (previously presented) The system according to claim 1, wherein the moisture separator is selected from the group consisting of at least one condenser, molecular sieve bed and chiller.

20. (withdrawn) A system for co-production of hydrogen and electrical energy comprising:

a fuel cell assembly comprising a plurality of fuel cells, the fuel cells further comprising a cathode inlet for receiving a compressed oxidant, an anode inlet for receiving a fuel feed stream, an anode outlet in fluid communication with an anode exhaust stream and a cathode outlet in fluid communication with a cathode exhaust stream; wherein at least a portion of the fuel feed stream reacts with the oxidant to

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produce electrical power and the anode exhaust stream comprises hydrogen; and

a separation unit in fluid communication with the fuel cell assembly, wherein the separation unit is configured to receive the anode exhaust stream from the fuel cell assembly to separate hydrogen from the anode exhaust stream;

wherein the fuel cell assembly is operated at a low utilization mode, in which the fuel feed stream is consumed at a rate less than or equal to 70%.

21. (withdrawn) The system according to claim 20, wherein the oxidant is air.

22. (withdrawn) The system according to claim 20, wherein the fuel cell assembly is operated at a voltage of about 0.7 volts to about 0.85 volts.

23. (withdrawn) The system according to claim 20, wherein the mole fraction of hydrogen at the anode outlet is between about 0.1 to about 0.5.

24. (withdrawn) The system according to claim 20, wherein the fuel cell is selected from the group consisting of solid oxide fuel cells, , molten carbonate fuel cells, , regenerative fuel cells, , and protonic ceramic fuel cells.

25. (withdrawn) The system according to claim 24, wherein the fuel cell is a solid oxide fuel cell.

26. (withdrawn) The system according to claim 20, further comprising a heat exchanger configured to receive and heat the fuel feed stream using the anode

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exhaust stream from the fuel cell assembly.

27. (withdrawn) The system according to claim 20, wherein the anode exhaust stream further comprises carbon monoxide, carbon dioxide, unreacted fuel and water.

28. (withdrawn) The system according to claim 27, wherein the separation unit comprises a carbon dioxide separator to separate carbon dioxide from the anode exhaust stream.

29. (withdrawn) The system according to claim 28, wherein the separation unit further comprises a low temperature shift reactor for converting carbon monoxide to carbon dioxide and a hydrogen separator.

30. (withdrawn) The system according to claim 27, wherein the separation unit further comprises a moisture separator to separate water from the anode exhaust stream.

31. (withdrawn) A system for co-production of hydrogen and electrical energy comprising:

a fuel cell assembly comprising a plurality of fuel cells, the fuel cells further comprising a cathode inlet for receiving a compressed oxidant, an anode inlet for receiving a fuel feed stream, an anode outlet in fluid communication with an anode exhaust stream and a cathode outlet in fluid communication with a cathode exhaust stream; wherein at least a portion of the fuel feed stream reacts with the oxidant to produce electrical power and the anode exhaust stream comprises hydrogen; and

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a separation unit in fluid communication with the fuel cell assembly, wherein the separation unit is configured to receive the anode exhaust stream from the fuel cell assembly to separate hydrogen from the anode exhaust stream;

wherein the fuel cell is operated at a low utilization mode in which the output voltage from the fuel cell assembly is maintained substantially below 1.0 volt.

32. (withdrawn) The system according to claim 31, wherein the fuel cell is selected from the group consisting of solid oxide fuel cells, molten carbonate fuel cells, regenerative fuel cells, and protonic ceramic fuel cells.

33. (withdrawn) The system according to claim 32, wherein the fuel cell is a solid oxide fuel cell.

34. (withdrawn) The system according to claim 31, wherein the fuel cell assembly is operated at a voltage of about 0.5 volts to about 0.7 volts.

35. (withdrawn) A system for co-production of hydrogen and electrical energy comprising:

a solid oxide fuel cell assembly comprising a plurality of solid oxide fuel cells, the solid oxide fuel cells further comprising a cathode inlet for receiving a compressed air, an anode inlet for receiving a fuel feed stream, an anode outlet in fluid communication with an anode exhaust stream and a cathode outlet in fluid communication with a cathode exhaust stream; wherein at least a portion of the fuel feed stream reacts with the oxidant to produce electrical power and the anode exhaust stream comprises hydrogen; and

a separation unit in fluid communication with the solid oxide fuel cell assembly, wherein the separation unit is configured to receive the anode exhaust stream from the

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solid oxide fuel cell assembly to separate the hydrogen from the anode exhaust stream;

wherein the fuel cell is operated at a low utilization mode in which the output voltage is maintained substantially below 1.0 volt.

36-41. (canceled)

42. (previously presented) The system according to claim 1, wherein the separation unit further comprises a moisture separator to separate water from the anode exhaust stream.

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